Universidad Andrés Bello

MAGÍSTER EN BIOTECNOLOGÍA Y CIENCIAS DE LA VIDA

FACULTAD DE CIENCIAS DE LA VIDA

Líneas de Investigación Académicos del Claustro

RNA & DISEASE

The Laboratory of RNA & Disease

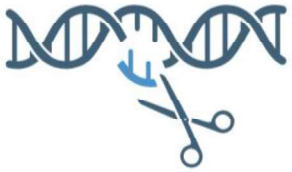
at the Institute of Biomedical Sciences

Dr. Rodrigo Aguilar

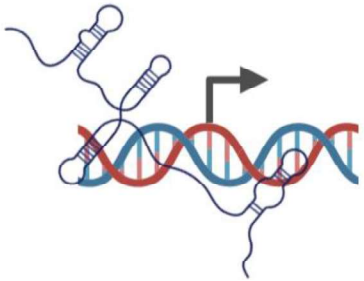
Instituto de Ciencias Biomédicas

What we study

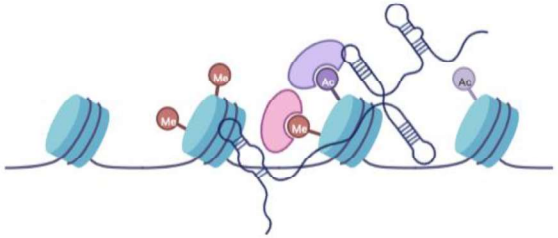
We study molecular mechanisms were RNAs are the main characters. We aim to understand how RNAs govern gene expression in healthy and diseased cells.



Sites relevant for function

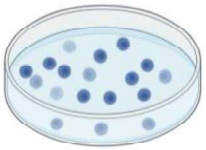


Control of gene expression



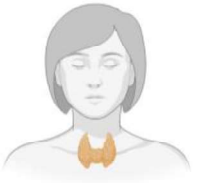
Collaboration with epigenetic enzymes

What we use

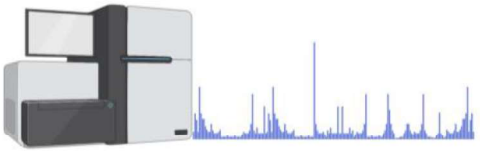


Cell culture

Organoids



Patient samples



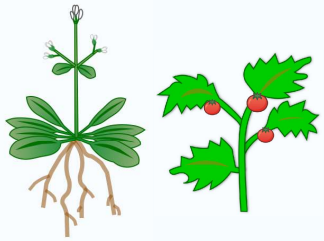
Deep sequencing and bioinformatics

Laboratorio de Regulación del Genoma Vegetal

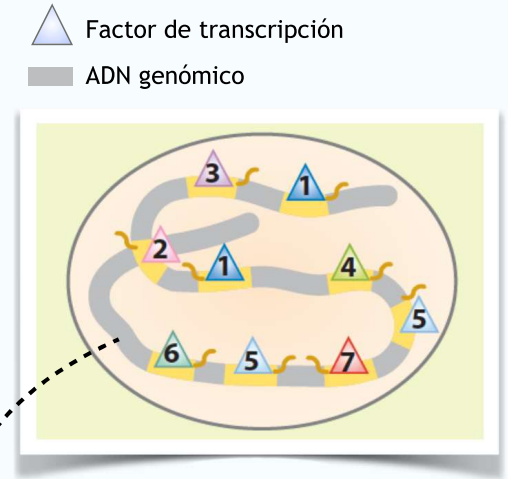
Dr. José Miguel Alvarez

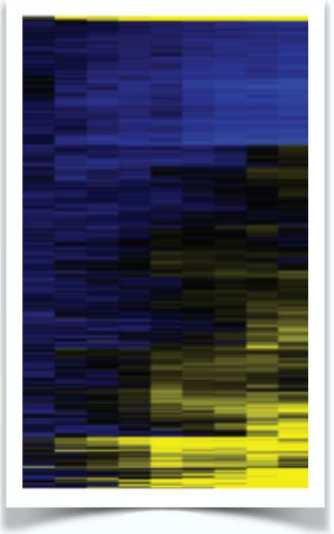
En el laboratorio estamos interesados en entender como las plantas se adaptan a la sequía. Estudiamos la regulación trasncripcional como un proceso clave para desarrollar estrategias que permitan generar plantas con mayor resistencia a la carencia de agua.

Sequía → Regulación transcripcional → Expresión genética a escala global → Respuesta fisiológica



H_2O



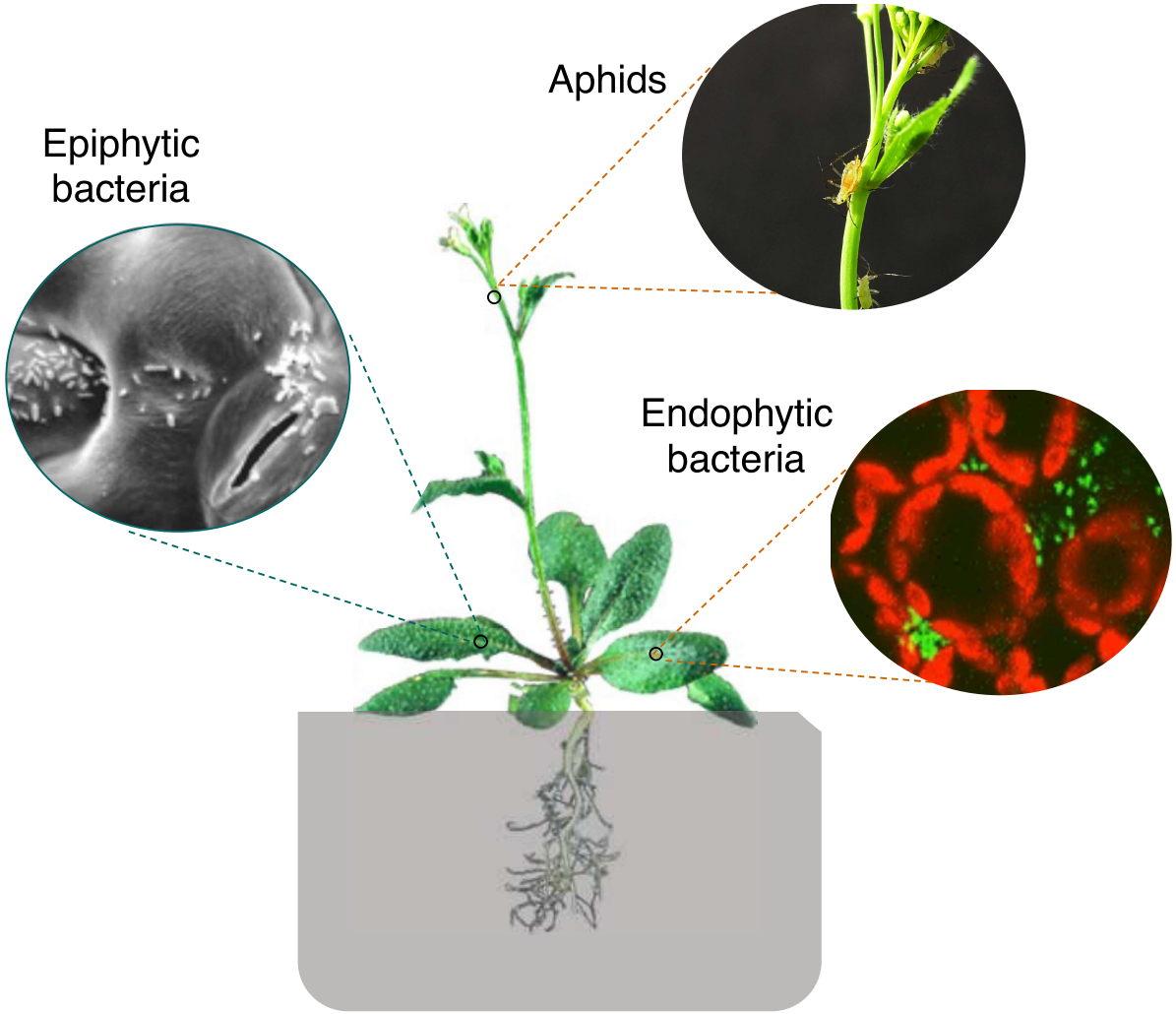


- Fotosíntesis
- Desarrollo de raíz
- Cierre de estomas
- Metabolismo
- Hormonas vegetales

Factores de Transcripción → *Cambios de expresión genética* → *Respuesta fisiológica* → Resistencia de plantas a la sequía

Plant Pathology Lab
Dra. Francisca Blanco-Herrera

PLANT PATHOLOGY GROUP



Aim. To understand the signaling pathways involved in plant responses to pathogen infections and how the pathogen manipulates the host to its benefit.

Specific Aims.
Analyze the tradeoff between defense response and development. Characterization of the structure and function of the cell wall and the involvement of hormones in the physiological process triggered by the infection/infestation of different model plants.

Methodology. Using system biology approaches to integrate the omics data into genome-scale metabolic models of both pathogens and hosts, to better understand the underlying mechanisms governing plant immunity and growth responses that finally lead to the pathogen success and plant sickness.

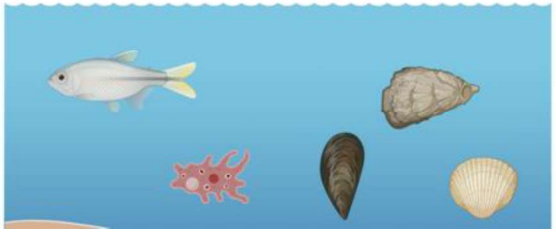
Universidad Andrés Bello · Instituto de Ciencias Biomédicas · Blondel Lab - Laboratory of Infection Biology

Laboratorio de Biología de la Infección

Dr. Carlos Blondel

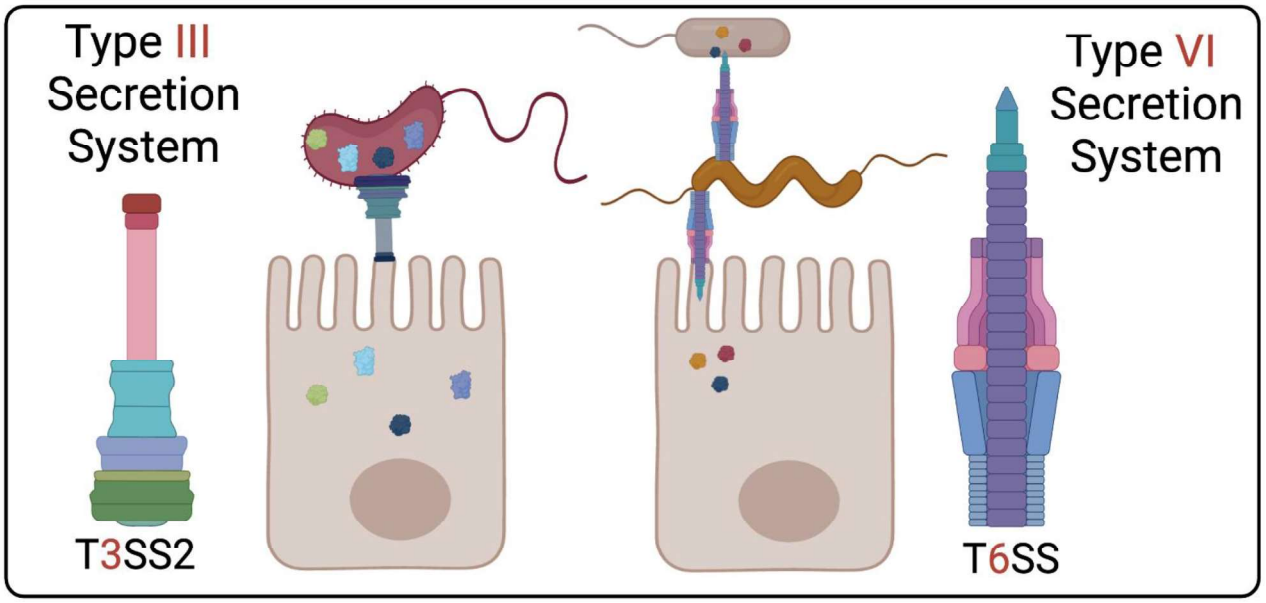
"Nuestro objetivo es contribuir a la comprensión de los mecanismos moleculares y celulares a través de los cuales las bacterias interactúan con sus hospederos y causan enfermedad"

Vibrio parahaemolyticus



Campylobacter jejuni

Imágenes hecas en biorender



Patógenos humanos ambientales como modelos para comprender la evolución de la virulencia bacteriana

Universidad Andrés Bello

CIMARQ
Centro de Investigación
Marina Quintay

LEPAM
Laboratorio de Estudio y Producción de Algas Marinas

Dr. Cristian Bulboa Contador
Profesor Asociado
Departamento de Ecología y Biodiversidad
Centro de investigaciones Marinas de Quintay
Facultad de Ciencias de la Vida
Universidad Andrés Bello
cbulboa@unab.cl

¿Qué estudiamos?

- ✓ Estrategias de reproducción
- ✓ Ciclos de vida
- ✓ Primeros estados de desarrollo
- ✓ Crecimiento

¿Qué desarrollamos?

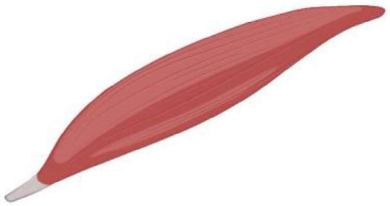
- ✓ Tecnologías de cultivo
- ✓ Tecnologías de repoblamiento/restauración
- ✓ Producción de semillas
- ✓ Domesticación de especies de valor comercial

Botánica Marina
Ficología Aplicada
Acuicultura de algas

Laboratory of Muscle Pathologies, Fragility and Aging

Dr. Claudio Cabello-Verrugio

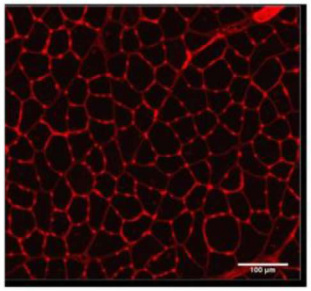
We aim to study the **cellular and molecular mechanisms that regulate muscle mass and strength,** specifically in sarcopenia caused by chronic diseases. In addition, we are looking for **therapeutic strategies** for its treatment.

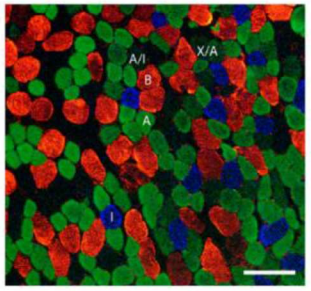


SARCOPENIC SKELETAL MUSCLE

CHRONIC DISEASES

- Soluble factors
- Intramuscular mechanisms
- Fibrogenesis and muscle regeneration





We used cell cultures and animal models

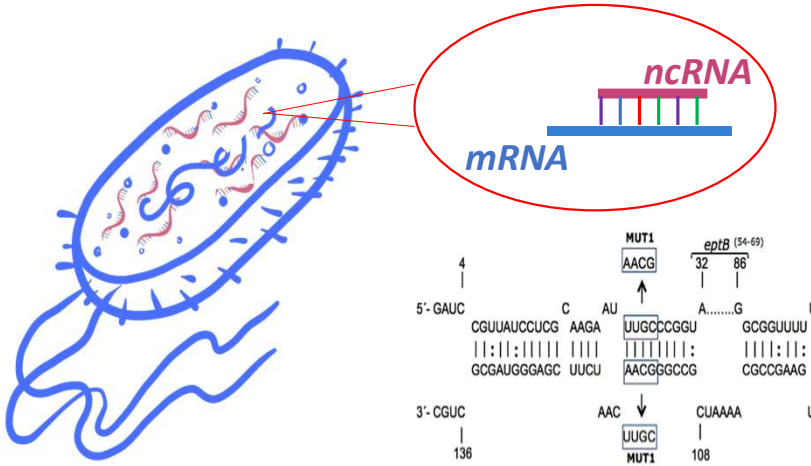
THERAPEUTICAL STRATEGIES

- Vasoactive peptides
- Nanotechnology
- Exercise

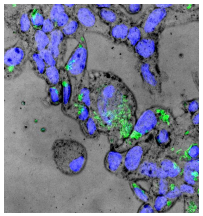
Bacterial RNAs Lab

Dr. Iván Calderón

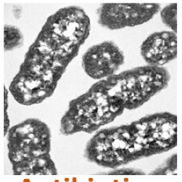
"We are interested in understanding how bacterial pathogens regulate their physiology, virulence and multiple stress responses by modulating gene expression with non-coding RNAs (ncRNAs) and other molecular factors. Our study models include salmonid and human pathogens, and we use molecular genetic techniques and biochemical assays"



Gene expression regulation

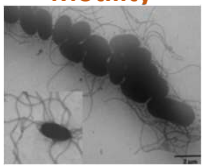


Virulence

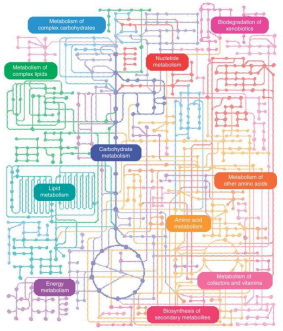


Antibiotic
&
Stress Responses

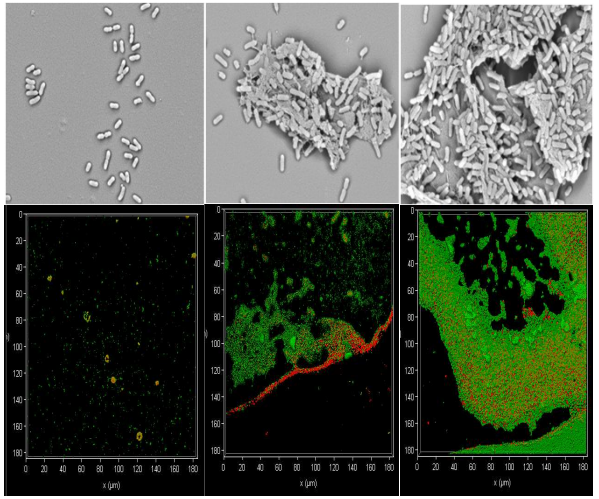
Motility



Metabolism



Biofilm formation



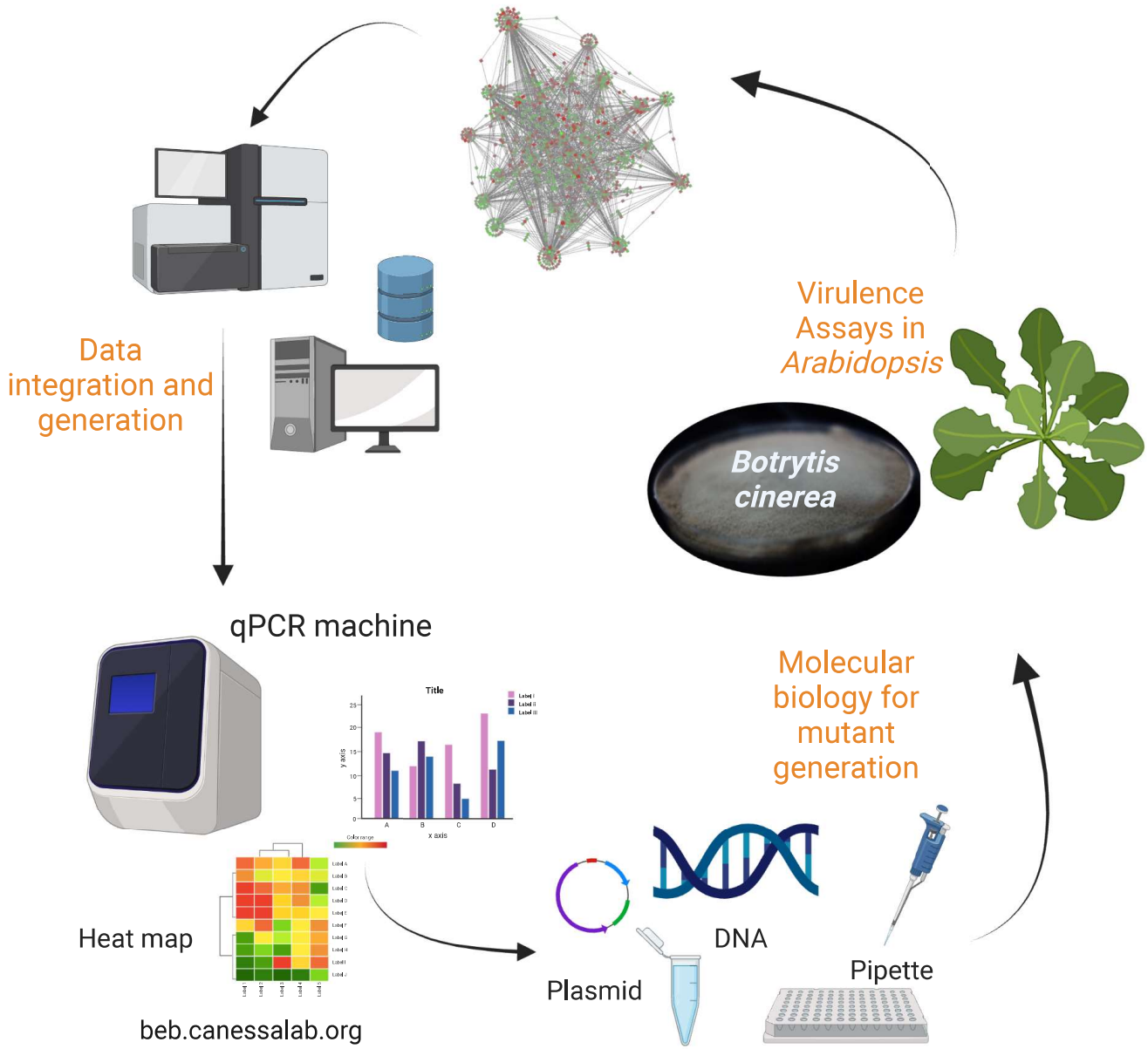
Plant-Fungal Interaction Lab

www.canessalab.org

Dr. Paulo Canessa

The Canessa lab is a fungal-oriented laboratory moved by understanding the role of the environment and how genes and their interactions with environmental signals (e.g., nutrients and light) modulate the outcome of the plant-pathogen interaction.

For this purpose, we use genomic data analysis, predictive bioinformatic strategies, as well as classic molecular approximations (functional genomics, gene *knockout* and *knockin*), employing the fungal phytopathogen *Botrytis cinerea* to perform virulence assays in *Arabidopsis thaliana.*



Universidad Andrés Bello | LEBMA Laboratorio de Ecología y Biología Molecular en Algas

Universidad Andrés Bello

Dra. Loretto Contreras Porcia

https://www.lebma.cl/

Mis líneas de investigación se centran en responder preguntas ecológicas relacionadas con las algas marinas mediante la aplicación de herramientas moleculares, que incluyen métodos bioquímicos, proteómicos, transcriptómicos y metabólicos. Muchos de mis proyectos actuales tienen como objetivo describir los mecanismos de tolerancia empleados por diversas especies de algas en condiciones ambientales variadas cuando se enfrentan a estresores naturales o antropogénicos. El objetivo final de esta investigación es comprender el patrón de distribución de las algas marinas dentro de un marco ecológico-económico y a escalas locales-regionales. Otra línea de investigación en curso bajo mi dirección es el uso de compuestos y derivados de algas marinas (por ejemplo, biochar) con funciones nutracéuticas y aplicaciones ambientales. Además, en los últimos años he dedicado tiempo a trabajar en la taxonomía clásica-molecular de las algas rojas, algas de particular importancia económica para Chile.

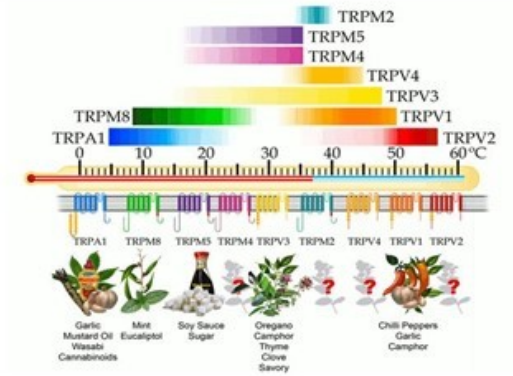
Contacto: **lorettocontreras@unab.cl**
loretto.contreras@gmail.com

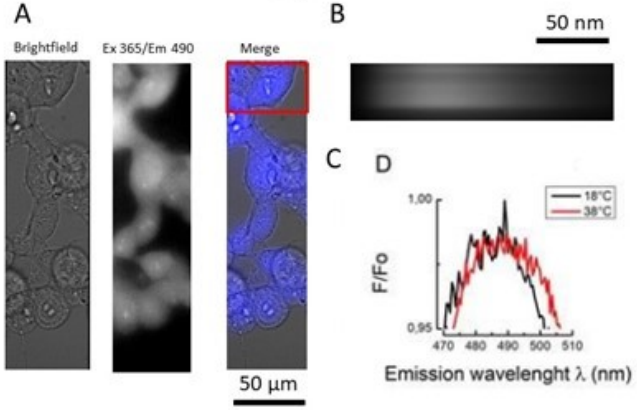
Universidad Andrés Bello

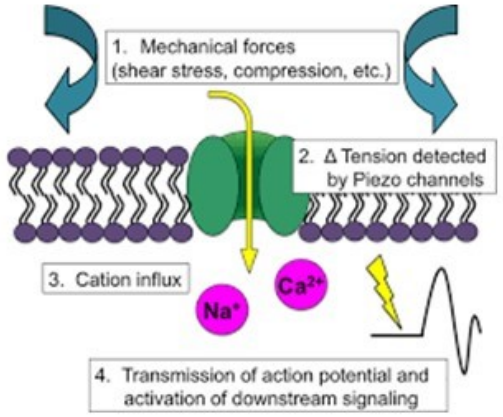
CBIB CENTER FOR BIOINFORMATICS & INTEGRATIVE BIOLOGY

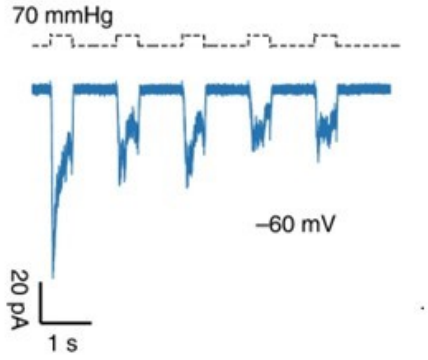
Molecular Physiology Lab

Dr. Ignacio Diaz Franulic









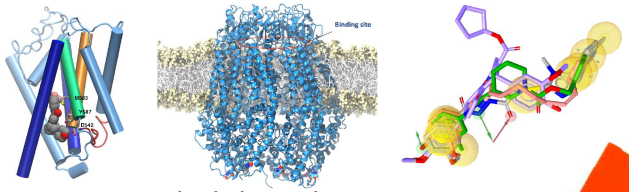
Living organisms detect physical stimulus using a repertoire of molecular sensors called ion channels. Our lab focuses on understanding the structure/function relationships of temperature- and mechanogated ion channels by combining site- directed mutagenesis, patch clamp electrophysiology and fluorescence spectroscopy.

Drug Discovery and delivery Lab

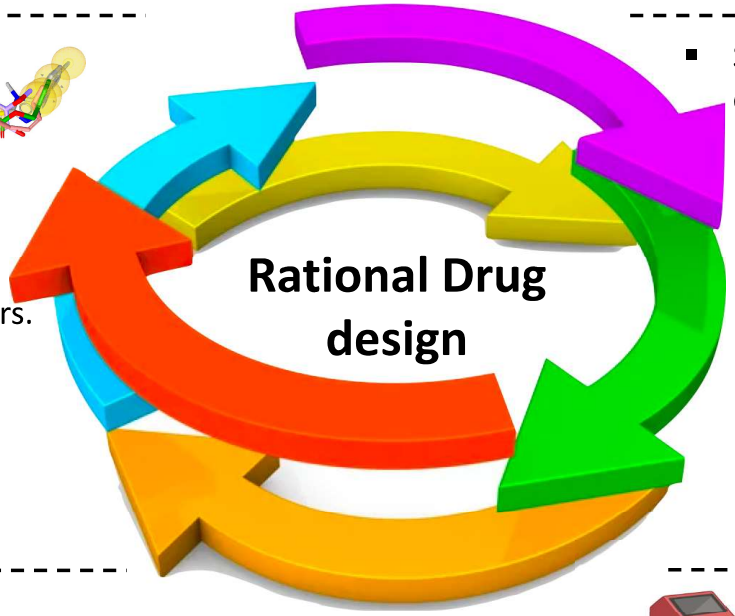
Dr. Yorley Andrea Duarte

Universidad Andrés Bello

Drug Design

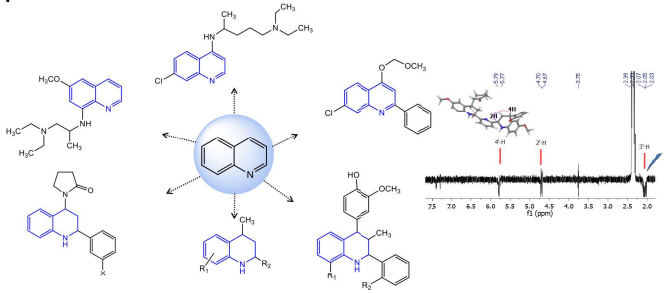


- Computer-aided drug design.
- Chemioinformatics.
- Hemichannels, AChE, Fxa, PAR receptors.

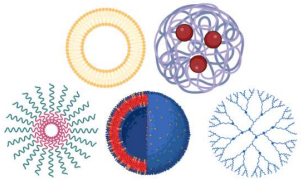


Chemical Synthesis

- Synthesis and characterization, quinoline scaffold.

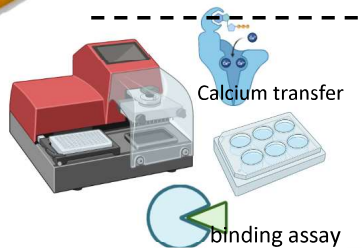


Drug Delivery systems

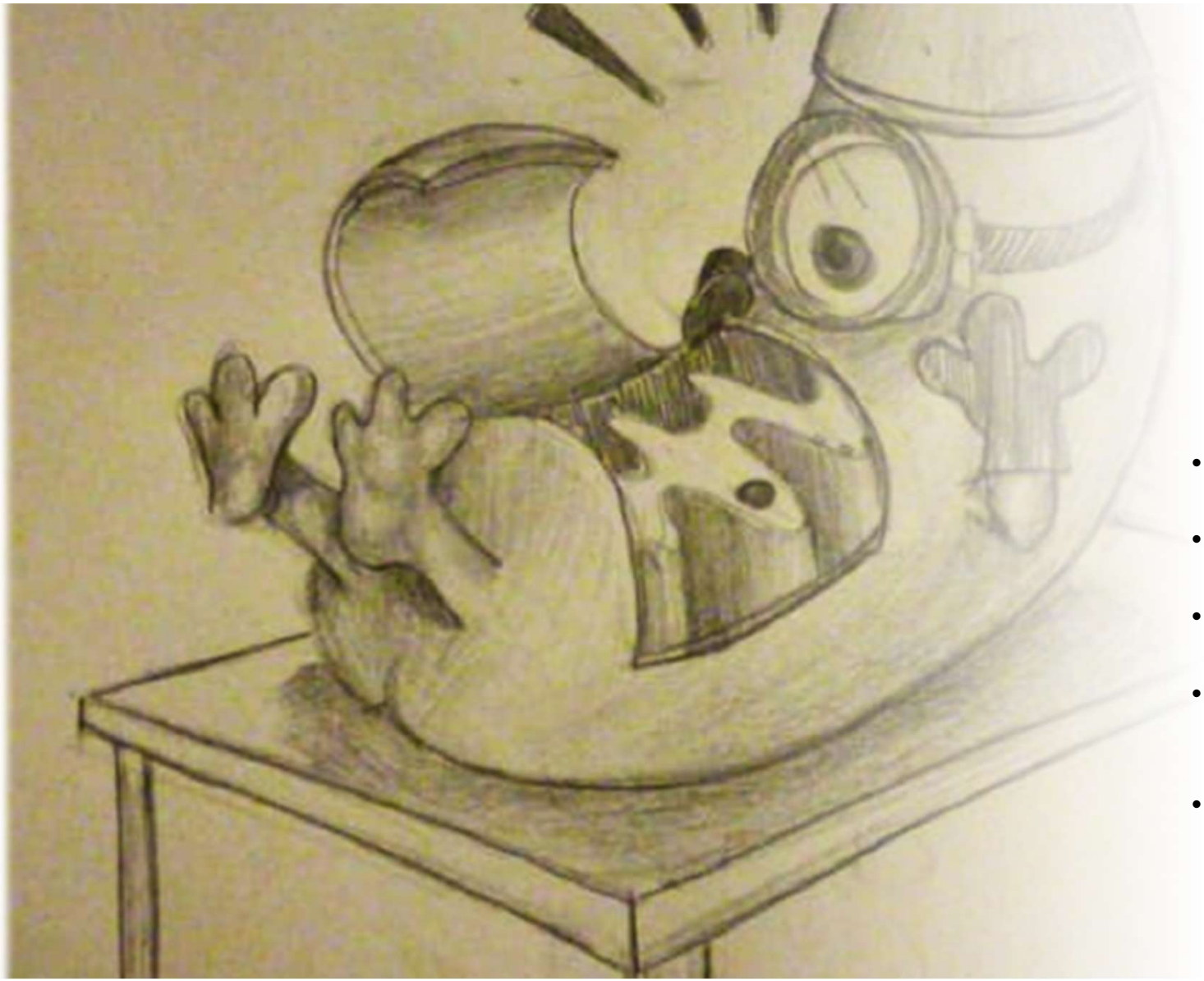


- Nanosystems.

Biological Assays



- Cytotoxicity assay kit
- In vitro enzymatic activity assay.



Universidad Andrés Bello

Instituto de Ciencias Biomédicas

Lab. de Medicina Mitocondrial
Dr. Alvaro A. Elorza

Lineas de Investigación

- Mitocondria en Cancer de Tiroides y Bucal
- Heteroplasmía mitocondrial en el envejecimiento
- Caracterización de nuevas proteínas mitocondriales de la mitofagia.
- Función mitocondrial y mitofagia en la diferenciación de células madre hematopoyéticas.
- Mitofagia en la sarcopenia primaria

Contacto: alvaro.elorza@unab.cl

Fish Immunology Lab

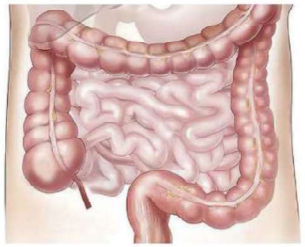
Dr. Carmen Gloria Feijóo

We aim to understand, at the cellular and molecular level, how immune cells participate in the induction of intestinal tolerance and inflammation using zebrafish as animal model.

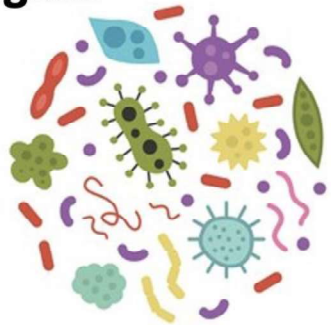
Food

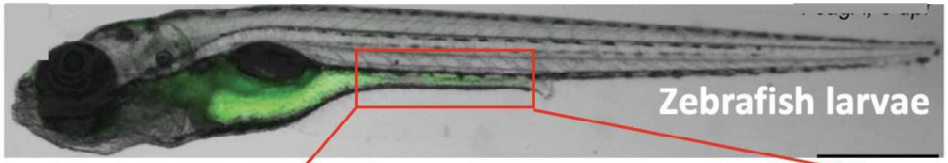
Oral Tolerance

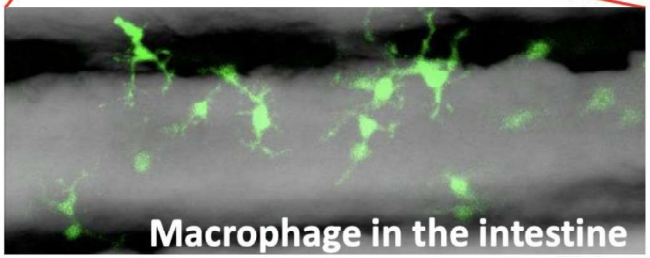
Inflammation



Pathogens







CENTRO DE BIOTECNOLOGÍA DE SISTEMAS (CSB)

Dr. Derie Fuentes

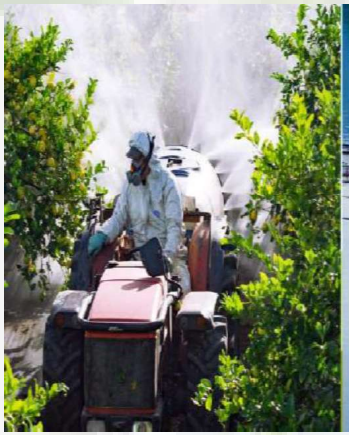
SALUD ANIMAL Y VEGETAL

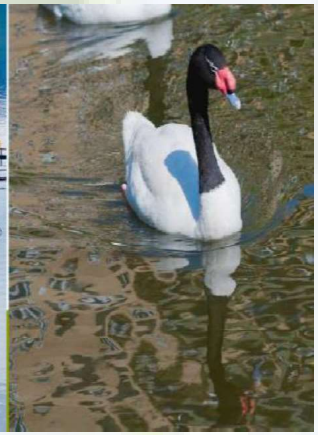
Diseño de dispositivos y metodologías de identificación y control de patógenos o microorganismos no deseados en diferentes procesos industriales.

Diseño de herramientas de control de patógenos diferentes a antibióticos.



GESTIÓN AMBIENTAL





Evaluación de impacto ambiental en el entorno de la operación de una industria o proceso productivo a través de herramientas moleculares.

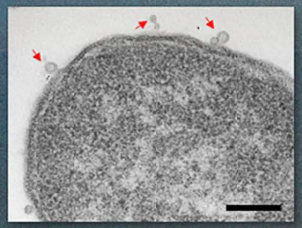
Evaluación de ciclo de vida y determinación de huellas de carbono y de agua en procesos productivos.

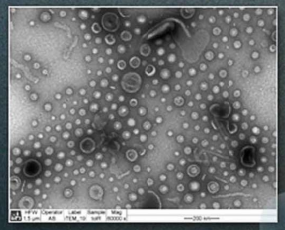
Laboratorio de Genética y Patogénesis Bacteriana

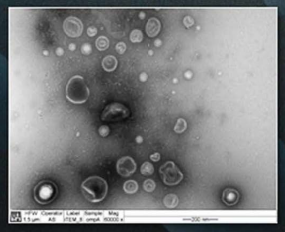
Facultad de Ciencias de la Vida
Departamento de Ciencias Biológicas
Dr. Juan Fuentes

Universidad Andrés Bello

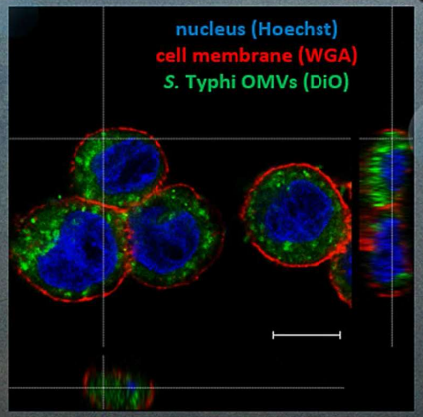
Bacterias Gram negativo



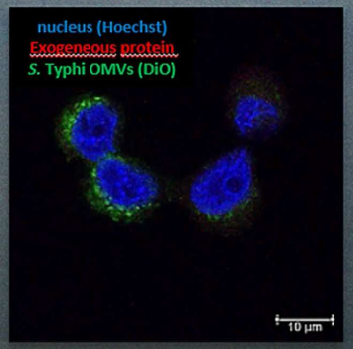




Vesículas de membrana externa bacterianas (OMVs)

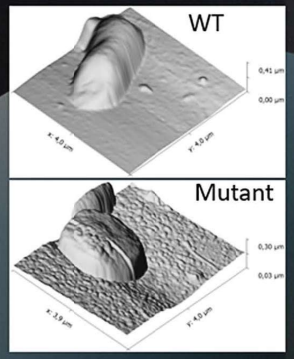


Interacción de OMVs con células eucariontes

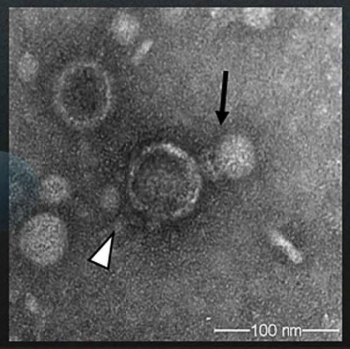


Entrega de proteínas exógenas a células eucariontes vía OMVs

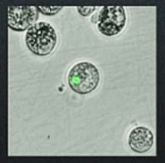
Ensayo de inmunoprotección basados en OMVs



Mutantes hipervesiculadoras

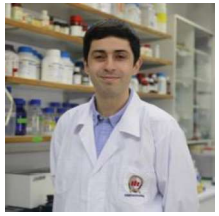


Interacción de OMVs con bacteriófagos



DNA entregado por OMVs expresado en células eucariontes

- Genética Bacteriana
- Factores de virulencia
- Interacción patógeno hospedero
- Vesículas de membrana externa bacterianas (OMVs)
- Biotecnología microbiana



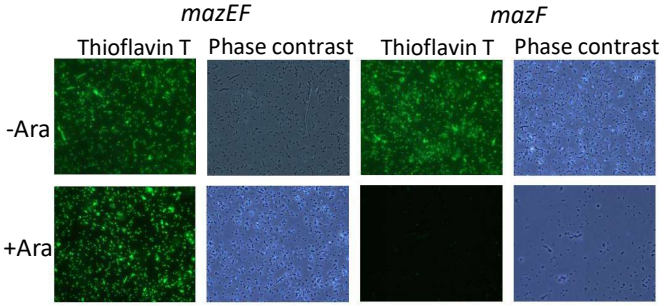
Fernando Gil Michell Ph.D.
- Molecular Biosciences
- Universidad Andrés Bello, Chile
- fernandogil@unab.cl

Microbiota-Host Interactions & Clostridia Research group
Biological Sciences department

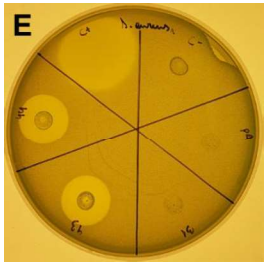
Research
1) Host persistence mechanisms of *Clostridioides difficile,* role of TA systems
2) Colonization and persistence of gut microbiota bacteria
3) Antimicrobial peptides

https://scholar.google.com/citations?hl=es&user=ziblCOQAAAAJ

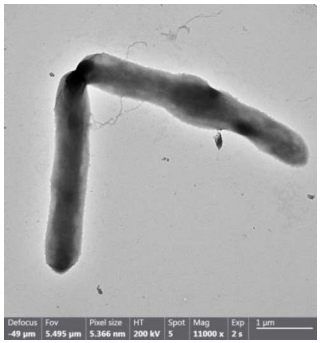
https://researchers.unab.cl/es/persons/fernando-gil-michell-4



***C. difficile* MazF toxin overexpression**



LanA peptide against *S. aureus*



TEM to visualize flagellum loss by chemical mutagenesis of *Roseburia inulinivorans*

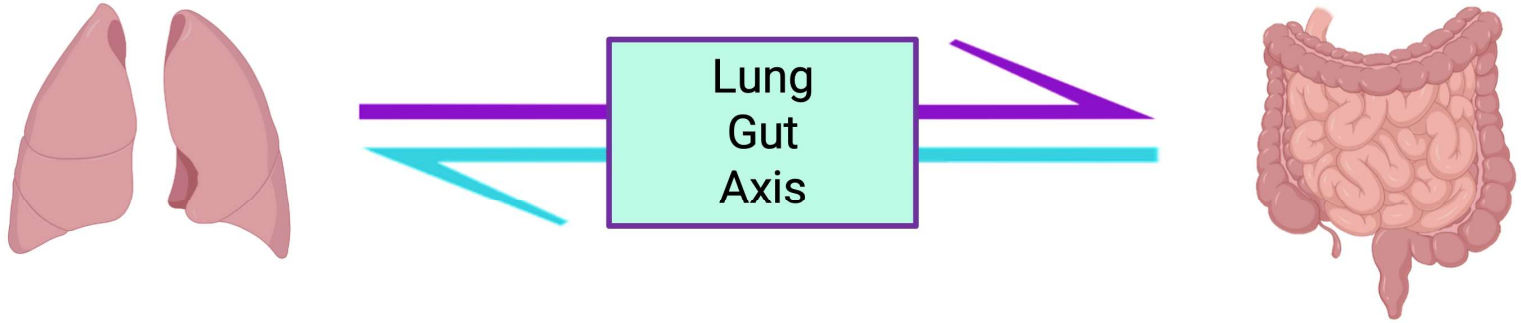
Millennium Nucleus in the Biology of Intestinal Microbiota (NU-GUTmicro)

Fondecyt
Fondo Nacional de Desarrollo Científico y Tecnológico

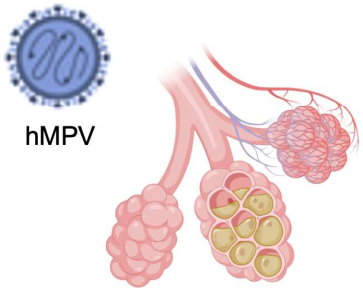
Laboratory of Systemic Immunointeractions and Intestinal Microbiota

Dr. Felipe Melo-González

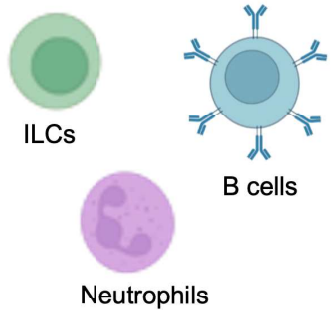
We aim to understand the regulation of the lung-intestine axis by different immune cells and the role of the microbiota in animal models of infection and inflammation of the respiratory and intestinal mucosa.



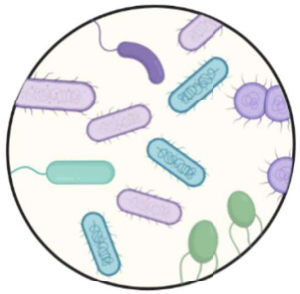
Role of viral pathogen infections in pneumonia and intestinal inflammation



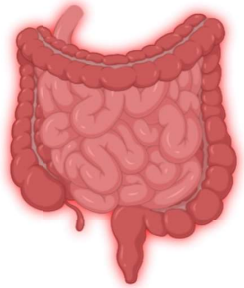
Alteration of immune populations in intestinal and lung inflammation



Role of intestinal microbiota in respiratory and intestinal inflammation



Changes in intestinal morphology and cytokine production during inflammation



Universidad Andrés Bello
Conectar · Innovar · Liderar

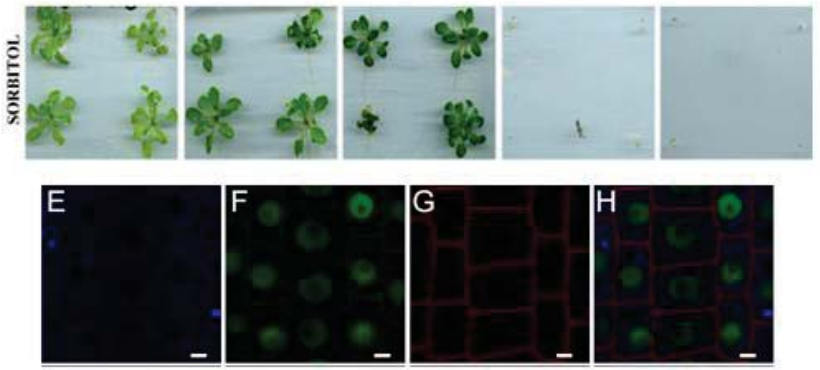
Millennium Institute
IMMUNOLOGY & IMMUNOTHERAPY

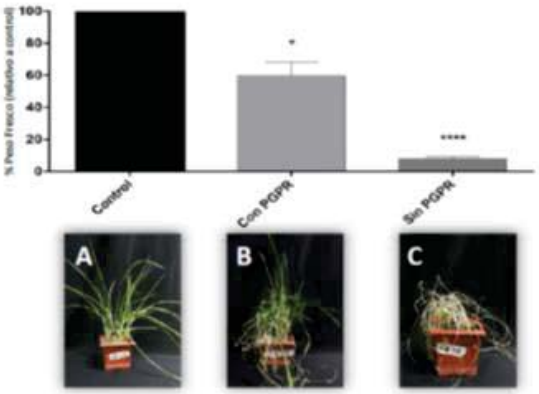
Laboratorio de Resiliencia y Señalización

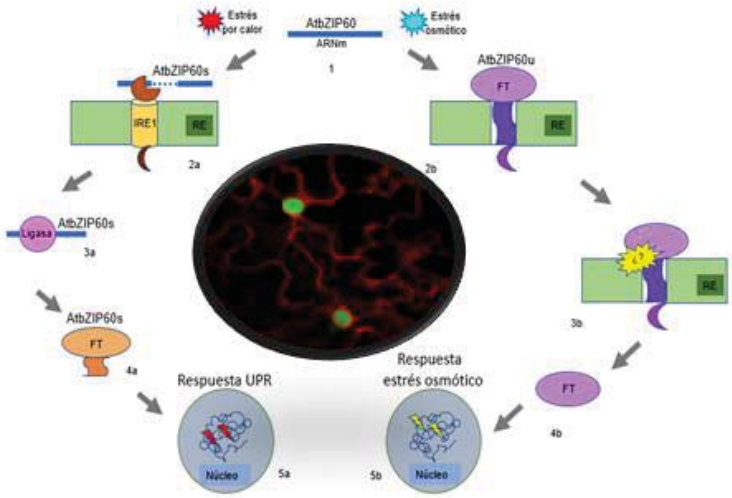
Dr. Adrian A. Moreno

Our laboratory is interested to explore, at celular and molecular level, the signaling between organelles and the nucleus upon plant exposure to abiotic stress, using the endoplasmic reticulum to the nucleus signaling as a model.

In addition, we are studying and collaborating on solutions to increase plant tolerance to abiotic stress such as the use of plant growth-promoting rizhobacteria (PGPR) and nanotechnology.



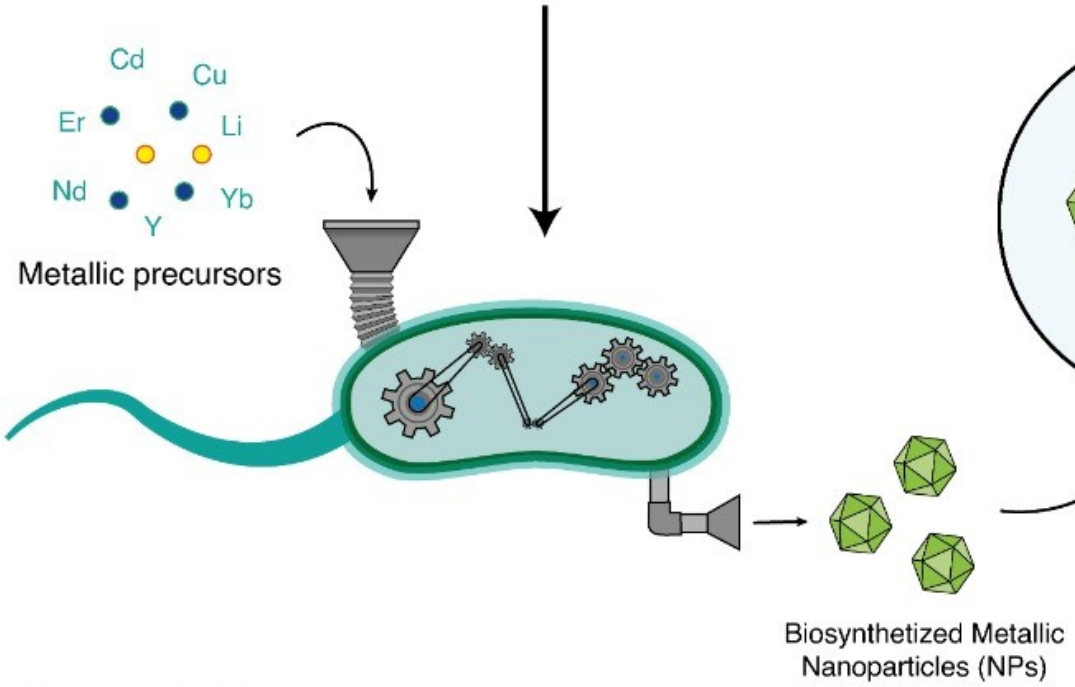


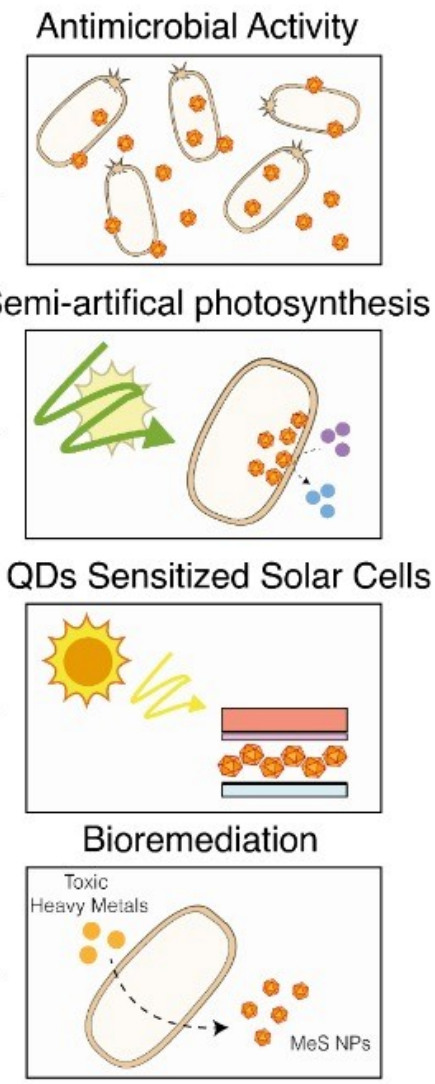


BioNanotechnology and Microbiology Lab

Dr. José Manuel Pérez-Donoso

We isolate bacteria from extreme chilean environments
to produce metal nanoparticles of technological interest





Universidad Andrés Bello
CBIB CENTER FOR BIOINFORMATICS & INTEGRATIVE BIOLOGY

centro de biotecnología vegetal

LABORATORIO DE HONGOS FITOPATÓGENOS

DR. RUBÉN POLANCO O.

Universidad Andrés Bello

Desarrollo de productos para el control de fitopatógenos fúngicos

Botrytis cinerea (**Bc**): Pudrición gris en uva de mesa

Hongos biocontroladores mejorados (**BCm**)

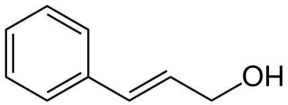
Clonostachys

Chaetomium

Empresa Asociada:

anasac

Fungicida basado en Metabolitos Termoestables



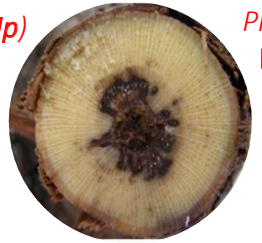
Compuestos antifúngicos volátiles

Sistema de encapsulamiento y liberación controlada "GAS EN POLVO"

Fabricación de Prototipos antifúngicos para uva de exportación

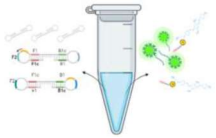
Sistemas de diagnóstico para hongos de la madera de la vid

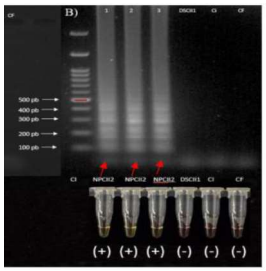
Neofusicoccum parvum (**Np**)
Diplodia seriata (**Ds**)



Phaeomoniella chlamydospora (**Pc**)
Np, **Ds** y **Pc** : Enfermedades de la madera de la vid (GTDs)

-Identificación de genes blanco
-Selección de regiones específicas
-Diseño partidores / amplificación isotérmica (LAMP)





Empresa Asociada:

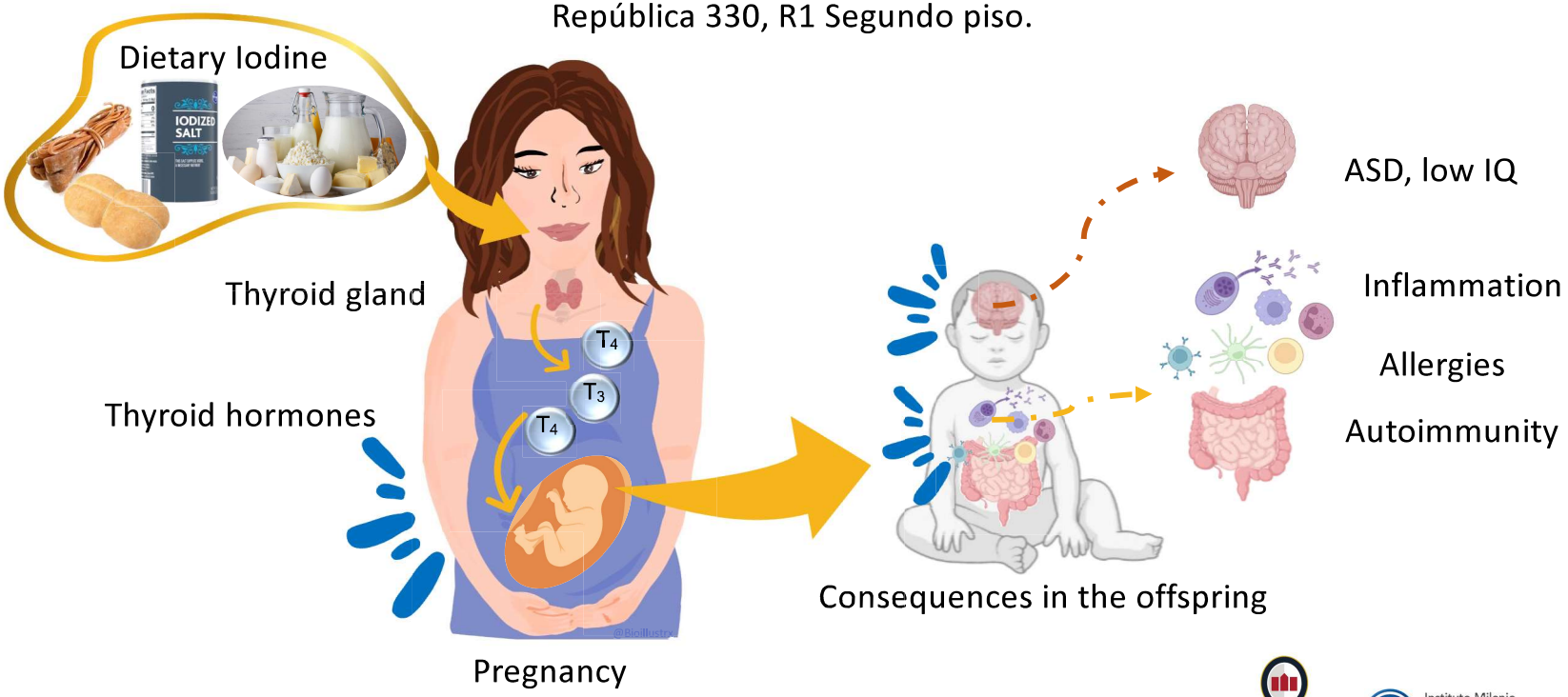
CONCHA Y TORO
DESDE 1883

KIT para detección de hongos de la madera de la vid

Laboratory of Endocrine & Immunology

Dr. Claudia Riedel

República 330, R1 Segundo piso.

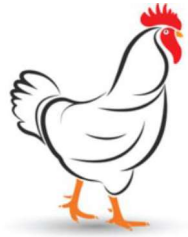


IMPRINTING OF MATERNAL HYPOTHYROXINEMIA IN THE OFFSPRING

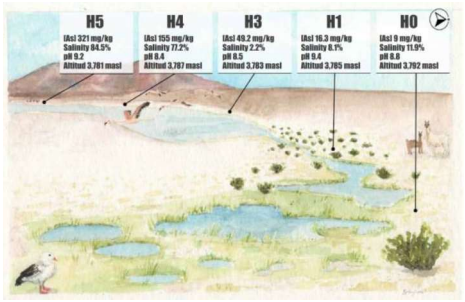
Our research focus to elucidate the mechanisms and the consequences of maternal thyroid hormone deficiency during pregnancy over the function of central nervous system, intestine and immune system of the offspring

Molecular Microbiology Lab

Dra. Claudia Saavedra



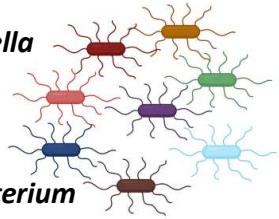
Poultry Farm



Salar del Huasco

Salmonella

Exiguobacterium



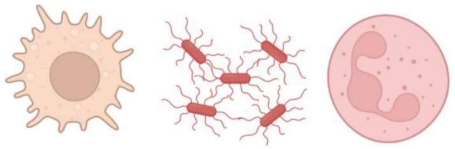
Molecular biochemical analysis

Bioinformatics analysis

Genomics
Transcryptomics

Biofilm
Pathogenecity

Stress response
Antibiotics resistance



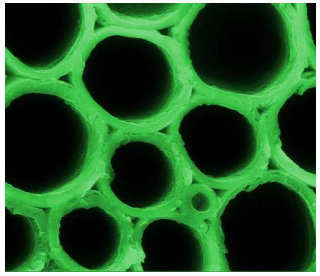
Heavy metals resistance
Bioremediation

As Hg Cu

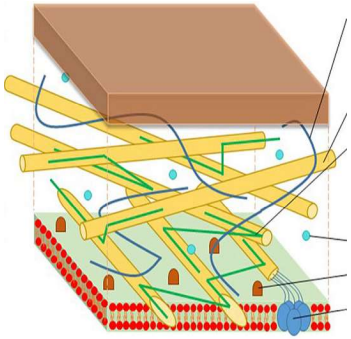
Our objective is to study the general biological processes and the evolution of Salmonella strains emerging from a chicken farm and of extremophile bacteria through genetic, molecular and biochemical approaches.

MUCILAB WORK: TRY TO UNDERSTAND THE BIOSYNTHESIS AND MODIFICATION OF PLANT CELL WALL POLYSACCHARIDES

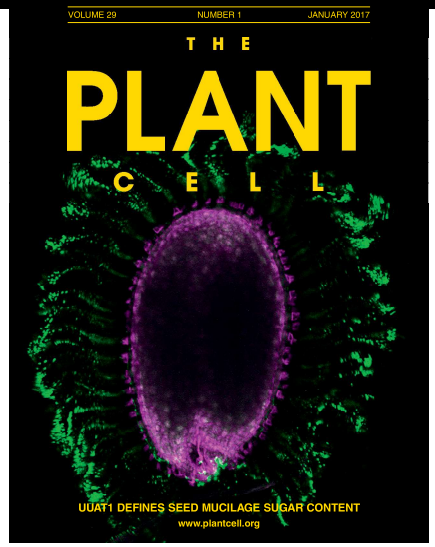
Susana Sáez PhD



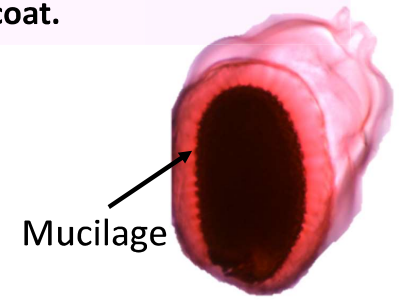
1.-The plan cell wall is a complex structure with represent the fist barrier of plant cells against environmental cues



2.-The plant primary cell wall is composed of cellulose , hemicelluloses and pectin. **Our laboratory search to investigate how pectin are synthetized and modified**

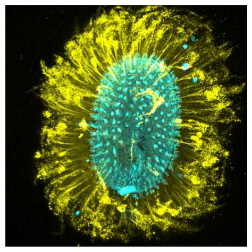


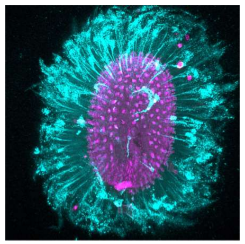
3.-Out laboratory use the mucilage as a tool to understand pectin metabolism. **Mucilage is a gel like structure produce by the seed coat.**



4.- We are working on the on the characterization of more than **10 genes acting on mucilage formation.**

Also we work on the study of other plant cell wall as “Chilean papaya”, Blueberries and flax seed mucilage.



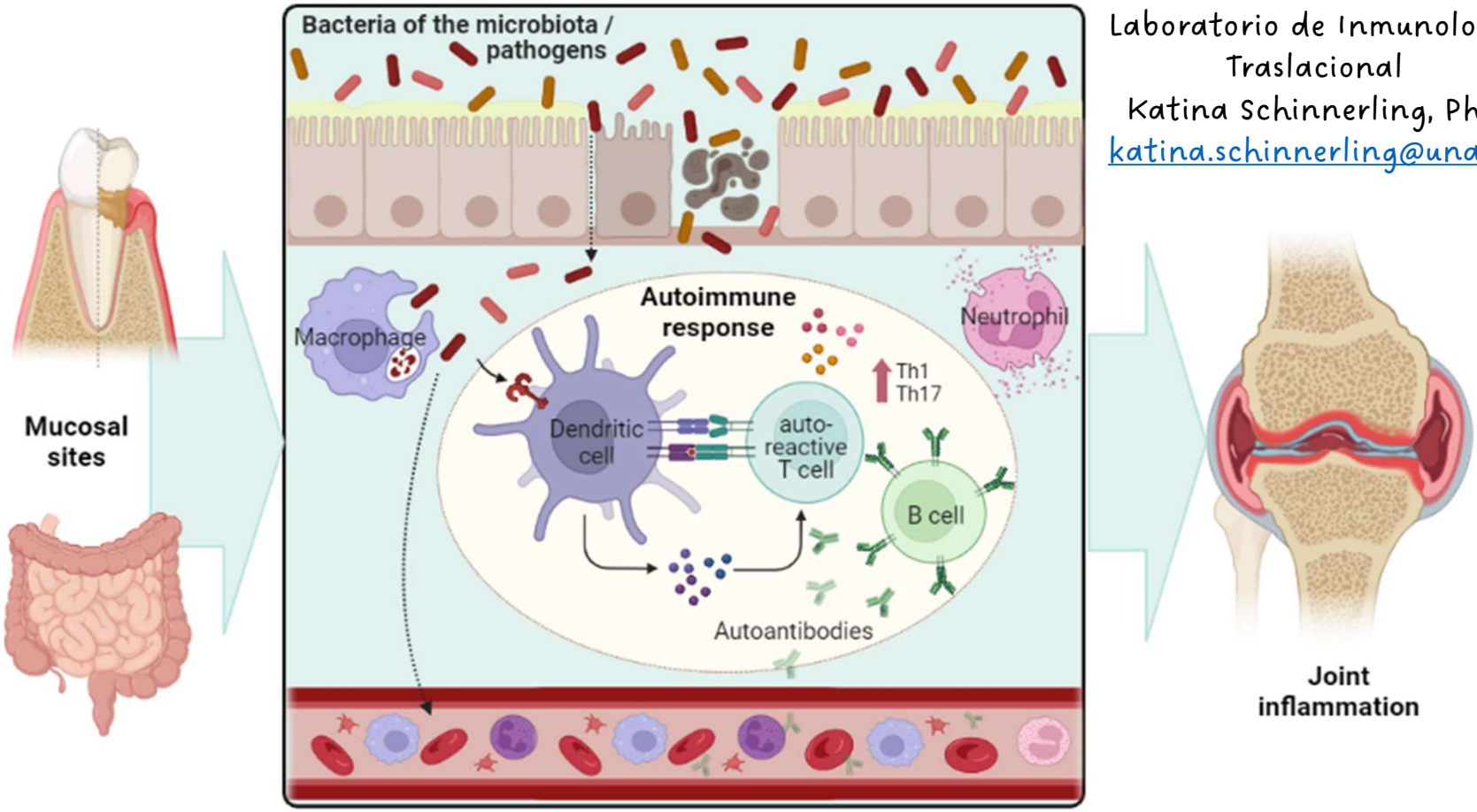


Skills developed in our team:
Biochemical, molecular biology, cytology

CHICO BIO

Mucilab

We are studying the role of oral and gut bacteria in the development and shaping of autoimmune joint inflammation in Rheumatoid Arthritis

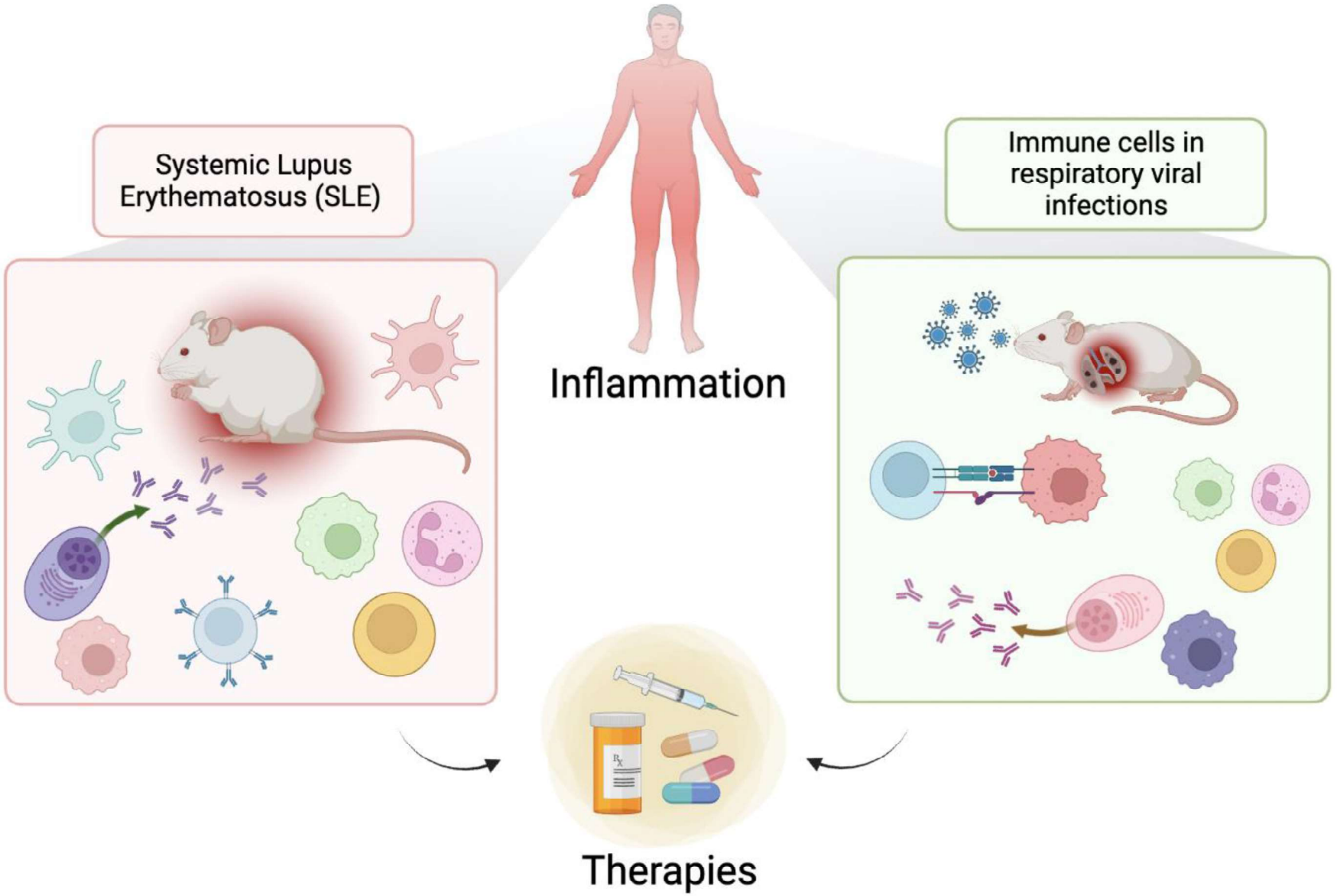


Laboratorio de Inmunología Traslacional
Katina Schinnerling, PhD
katina.schinnerling@unab.cl

Translational Immunology Laboratory

Dr. Jorge Soto

Our objective is to identify the role of the immune system during inflammatory processes for identifying future therapeutic targets.



Neurobiology lab

Dr. Jimmy Stehberg

Cellular and molecular mechanisms associated with psychiatric disorders and memory

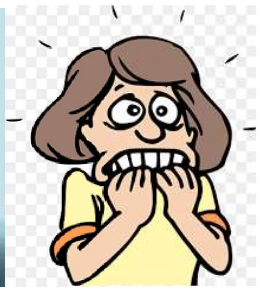
Identify the dysfunctional brain circuitry associated to psychiatric disorders

Characterize the molecular mechanisms associated with brain physiology and pathology

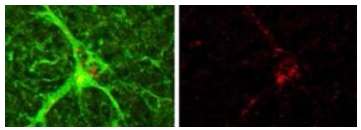
Find novel pharmacological targets for the treatment of psychiatric disorders

Design novel drugs and approaches to treat psychiatric disorders

Psychiatric disorders and memory

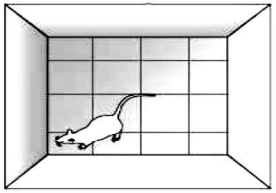


In vitro



Ex vivo

In vivo pharmacology



Behavior

Clinical

Microbial Data Science

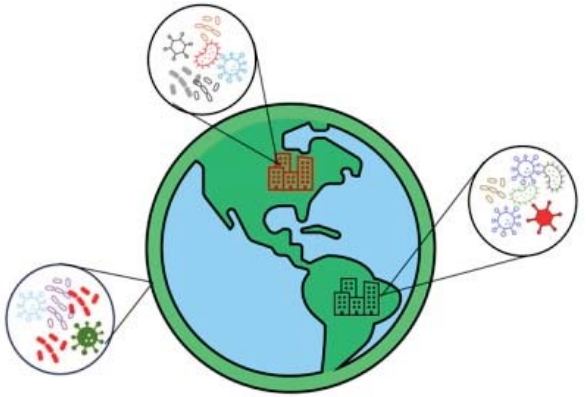
Dr. Juan A. Ugalde

Our work focuses on the application of genomics, data science, and bioinformatics approaches to understand the microbial world that surround us

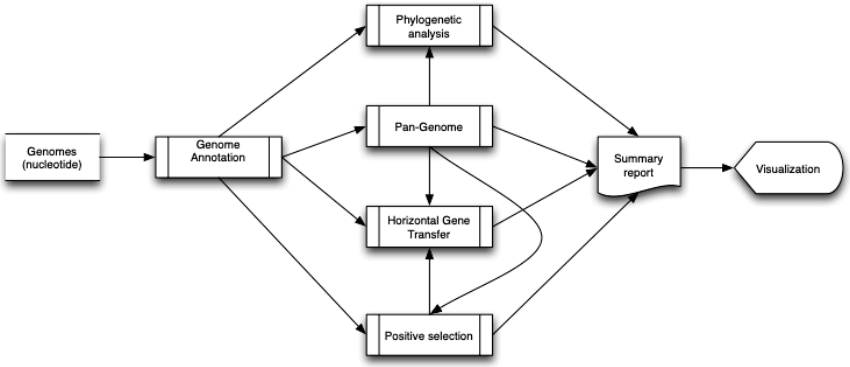
Microbial genomics

Human microbiome

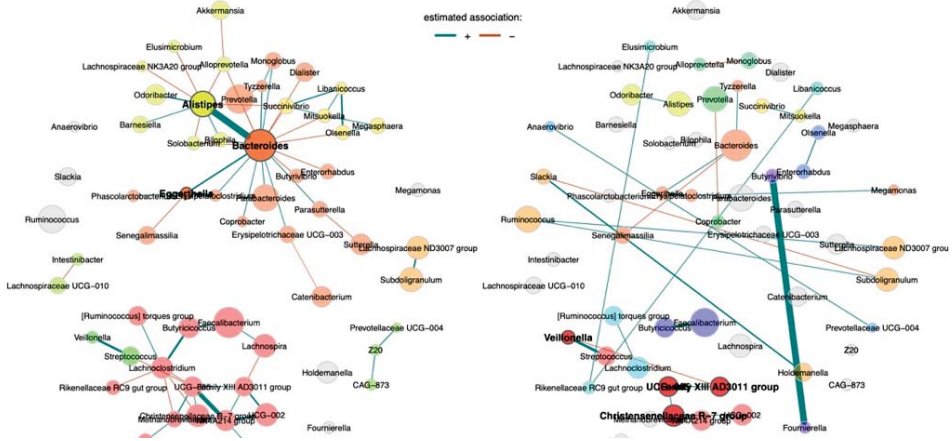
Environmental Microbiomes



Development of bioinformatics pipelines



Data analysis and visualization

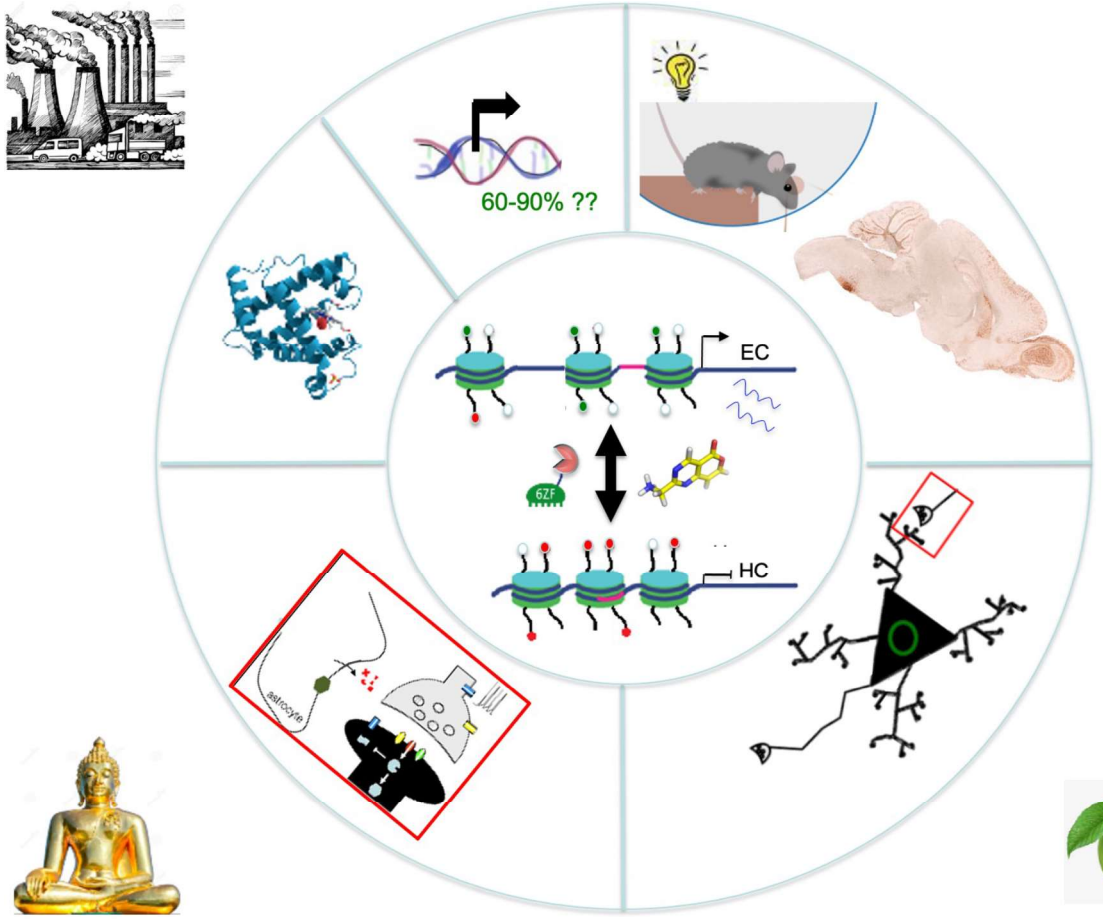


Laboratory of Neuroepigenetics

Dra. Brigitte van Zundert

Our line of investigation:
Studying the mechanisms underlying brain plasticity and neuroepigenetics in health (learning & memory) and in disease (amyotrophic lateral sclerosis, frontotemporal dementia, Alzheimer's disease and Huntington`s disease); role of genetic factors and external factors (i.e. urban air pollution).

Our mission:
We believe that the acquired knowledge will open avenues for developing effective diagnostic and therapeutic approaches to slow the progression and, more optimistically, to prevent, halt, or even revert the effects of these devastating neurodegenerative diseases.



Laboratorio de Neuroepigenética | Universidad Andrés Bello | Instituto de Ciencias Biomédicas | UMASS MEDICAL SCHOOL

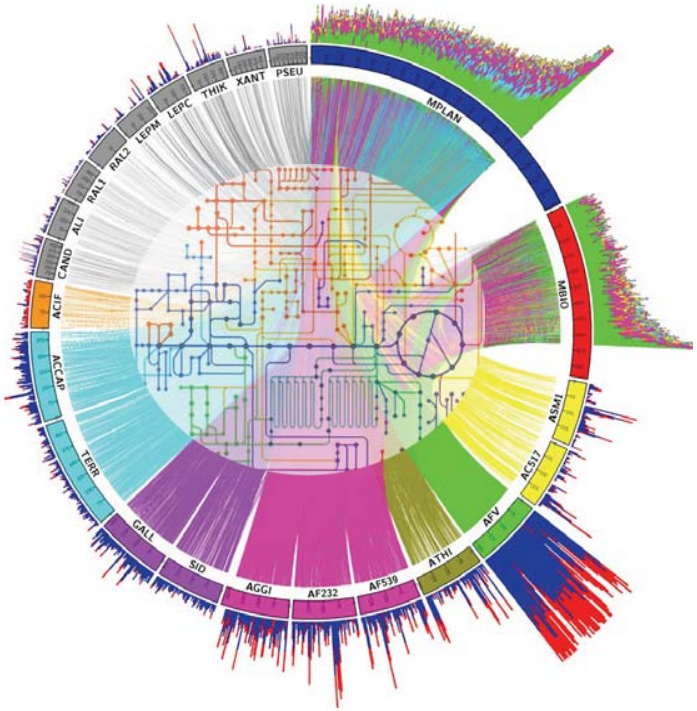
Bioinformatics and Applied Genomics Laboratory

Center for Bioinformatics and Integrative Biology

Dr. Jorge H. Valdés



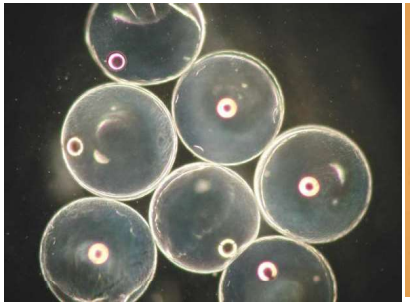


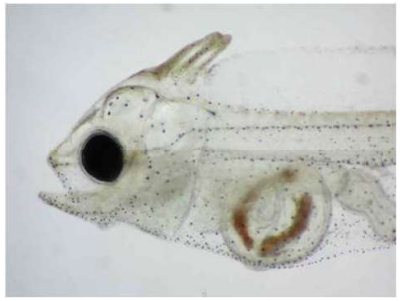



"Nuestro laboratorio estudia la evolución genómica y sus consecuencias fenotípicas en organismos de interés biotecnológico mediante la utilización de estrategias OMICAS y el diseño, construcción e implementación de herramientas bioinformáticas. Nuestro trabajo ha contribuido al estudio de microorganismos extremófilos, hongos patógenos y de interés productivo, y especies vegetales de interés agrícola y forestal"

Laboratorio de Biotecnología Molecular
Dr. Juan Antonio Valdés

Optimizing the farming of Chilean flounder using biotechnological tools






We aim at the use of molecular and biotechnological tools to solve contingent problems in national aquaculture

Until the last hope:
THE ISA VIRUS, SALMON FARMING AND PATAGONIA
Hasta la última esperanza:
EL VIRUS ISA, LOS SALMONEROS Y LA PATAGONIA
At least 70 percent of the Chilean salmon industry is found in the Los Lagos region, but due to the contamination its left behind, companies are migrating further south into Patagonia.
Al menos 70% de la industria salmonera chilena se encuentra en la Región de Los Lagos, pero debido a la alta contaminación en ríos y mares que ha dejado su producción, las empresas están migrando peligrosamente hacia los mares australes.
By **HECTOR KOL** Photos by **FRANCISCO NEGRONI**

The economic cost of sea lice to the Chilean salmonid farming industry

Aquaculture Diversification: CIMARQ


Laboratory of Cellular and Molecular Neurobiology

Dr. Lorena Varela-Nallar

We aim to understand the signaling mechanisms controlling neurogenesis in the adult hippocampus, and to stimulate this process in models of Alzheimer's disease to improve cognitive function